

ously occurring sharp little ticking sounds from among the Karvi and realized that the ticking was caused by Karvi capsules suddenly splitting open and catapulting the seeds outwards and upwards, sometimes to a distance of over 4 feet from the parent plant.

We spent some time in the area observing the busy broadcasting operations. It was noticed that they were actively under way only in areas which were directly under sunlight. On contours of the slope still in shade there was hardly any seed shedding activity, and the capsules were completely covered by bracts, whereas in the active areas the bracts had opened out slightly exposing the capsules to perform their broadcasting function unhindered.

The capsules are dark brown, flat, shaped like a broad, symmetric spearhead, pointed both at the apex and base, c.  $18 \times 8$  mm. A seam runs down the middle of both flat sides from apex to base. The split occurs along this seam. The two parts or valves of the split capsule sometimes remain open, joined at the base, but quite often drop off with the force of their own little explosions.

Each capsule normally contains a pair of

seeds, ovoid, paper thin flakes, off white in colour, which are buoyant on the wind as they are flung out from the capsule and so are spread more or less evenly. Though quite conspicuous on the wet dark brown earth yet strangely no birds seemed to be interested.

This and other Karvi patches were visited on subsequent days in the hope of witnessing another mass broadcasting but nothing notable occurred except for an occasional capsule splitting which would have gone quite unnoticed if not expectantly watched for.

During the next fortnight the earth remained continuously damp. The moist seeds discoloured slightly and stuck to the soil with mildew-like filaments firmly enough not to be washed down by heavy rain.

By the 14th of June when we left the hill, most of the Karvi had shed their seed. They must have done so on different days at different times, unobserved, unappreciated and unrecorded. It was rare good fortune that in the first instance we came upon the right place on the right day, at the right time. How rare the good fortune was can be appreciated when one considers that Karvi flowers and seeds once in eight years.

4-A, RASHMI,  
CARMICHAEL ROAD,  
BOMBAY-400 026,  
September 19, 1977.

D. J. PANDAY  
J. D. PANDAY

## 25. THE GENUS *AMOMUM* ROXB. (ZINGIBERACEAE) IN ANDAMAN AND NICOBAR ISLANDS

(With two plates)

### INTRODUCTION

The first species of *Amomum* to be reported from Andaman and Nicobar Islands was *A. fenzlii* which was described with illustra-

tions by Kurz in 1876. Subsequently Baker in 1892 reported *A. aculeatum* Roxb. from S. Andaman Island based on a collection by Kurz. Recent intensive botanical explorations in different islands revealed that in addition

to the above, another species *A. maximum* Roxb. also occurs in S. Andaman Islands. *A. fenzlii* is endemic to Nicobar group of islands where it is common in Car Nicobar, Katchal and Great Nicobar Islands. This species is not found in Andaman group of islands. *A. aculeatum* Roxb., a species found in Malaysia & Java has never been collected from these islands ever since Kurz made his collection in 1870. Recently this species was again collected from dense forests in S. Andamans along with another interesting rare species *A. maximum* Roxb. Roxburgh's original description of *A. maximum* Roxb. was based on specimens brought from 'Malay Islands' by Colonel Kyd. It is surprising that subsequent authors Ridley (1924) and Holttum (1950) have never reported this species as occurring in Malaya. Most probably the 'Malay Islands' cited by Roxburgh refers to Andamans where Col. Kyd made collections in 1791. Backer & Bakh. f. (1968) give *A. dealbatum* Roxb. a species occurring in NE. India, as synonymous to *A. maximum* Roxb. However it is doubtful whether they really belong to same species. The specimens studied by us from Andamans and also the original description by Roxburgh differ from *A. dealbatum* in longer peduncles of inflorescences, elliptic-obovate, entire and not emarginate lip, shorter filaments and aromatic pungent fruits and seeds. Moreover recent studies of Assam plants of *A. dealbatum* Roxb. by Rao & Verma (in *Bull. Bot. Surv. India* 14: 135. 1972) indicate that the leaves are brown pubescent beneath whereas the Andaman plants of *A. maximum* Roxb. show whitish pubescence.

The descriptions and illustrations given were drawn up from fresh plants.

KEY TO SPECIES

- 1a. Inflorescence dense-flowered with many closely imbricate bracts; anther not crested; lip narrow, up to 1.2 cm broad, as long as corolla lobes, longitudinally folded, inflexed at tip. 1. *A. fenzlii*
  - 1b. Inflorescence lax-flowered with fewer loosely arranged bracts; anther crested; lip broader, longer than corolla lobes, not folded longitudinally, reflexed at tip.
  - 2a. Petioles very short; lip wedge-shaped, 3-lobed at apex; anther crest 3-lobed; filaments 1.2—1.4 cm long. 2. *A. aculeatum*
  - 2b. Petiole long; lip elliptic-obovate, entire; anther crest truncate; filaments shorter, 2-3 mm long. 3. *A. maximum*
1. ***A. fenzlii*** Kurz in J. As. Soc. Beng. 45 (3): 154, t. 12. 1876; Baker in Hook. f. Fl. Brit. Ind. 6: 234. 1892.
- Plants 3-4 m tall, leaves broadly lanceolate to oblong lanceolate, obtuse to obliquely subattenuate at base, shortly acuminate at apex, 40-85 cm long, 11-15 cm broad, glabrous, dark green above, pale beneath; petiole 1.5-2.5 cm long, 4-6 mm thick, glabrous; ligules broadly ovate, obtuse to subacute at apex, ciliate at margins, 1.5-2.0 cm long, 1.0-1.5 cm broad. *Inflorescences* arising from the rhizome, glabrous, densely flowered; peduncle 8-18 cm long; sterile bracts elongate-ovate, 4-6 cm long, 1.2-1.6 cm broad, reddish brown, ciliate at margins; floral bracts ovate to linear obovate, 3-5 cm long, 1.0-2.5 cm broad; reddish; bracteoles tubular at base, bifid at apex, 1.9-2.2 cm long, pubescent. *Calyx* 2.0-2.5 cm long, oblique and 2-fid at mouth, pubescent. *Corolla-tube* 1.5-2.0 cm long; lobes 3, narrowly obovate, 1.8-2.0 cm long, 3-4 mm broad, pubescent outside. *Labellum* elongate-rhomboid, attenuate at base, narrowed towards apex, sometimes obscurely 3-lobed, 1.8-2.0 cm long, 0.8-1.2 cm

broad; lobes inflexed, pale red, glabrous. *Anther* 5-6 mm long, 2-3 mm broad, inappendiculate, ciliate towards base; filaments 4-5 mm long, 2-3 mm broad; staminodes absent. *Ovary* 4-5 mm long, 3.0-3.5 mm thick, densely villous; style 2.2-2.5 cm long, pubescent; stylodes 2,  $\pm$  4 mm long, 2-3 mm broad, pubescent at apex; stigma trigonously capitate, glabrous. *Capsules* obovoid, irregularly ridged, 2.0-2.5 cm long, 1.0-1.5 cm broad, pubescent.

CAR NICOBAR ISLAND: Arong, Sea Level, 21 May 1975, *N. G. Nair* 2631 (PBL); KATCHAL ISLAND: Mildera,  $\pm$  30 m, 9 May 1975, *P. Chakraborty* 1531 (PBL); GREAT NICOBAR ISLAND: Campbell Bay,  $\pm$  75 m, 19 May 1975, *N. P. Balakrishnan* 2690 (PBL); East-West Road, 33 KM from Campbell Bay,  $\pm$  165 m., 22 July 1976; *N. P. Balakrishnan* 3942 (PBL).

*Distribution*: Endemic to Nicobar Islands.

*Notes*: This species is very common in Great Nicobar Island especially in inland hill forests wherever there is some sunshine penetrating and reaching the forest floor. In a stray plant (*Balakrishnan* 3942), the inflorescences were found to be arising from the tip of the pseudostems amidst leaves and also in the same plant mature fruits were found at the base of the stem on rhizome! This may be due to an accidental prolongation of peduncle through the pseudostem.

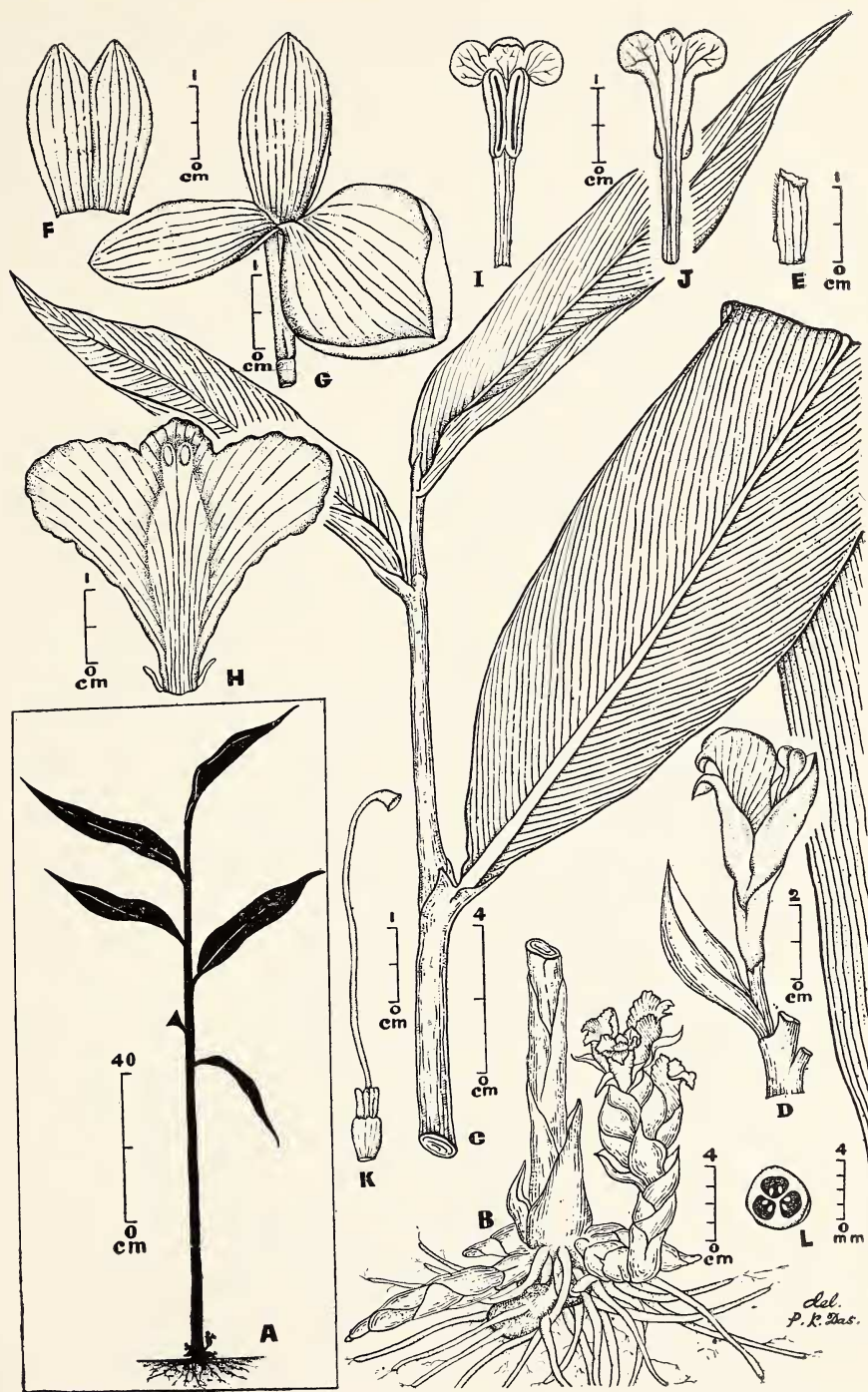
In the illustration given by Kurz (l.c., t. 12), the figures labelled by him as staminodes are actually stylodes. Study of several flowers from different localities indicate complete absence of any staminodes at the base of lip, in contrast to the following two species.

2. *A. aculeatum* Roxb. *Asiat. Res.* 11: 344, t. 6. 1810 et. *Fl. Ind.* 1: 40. 1820; Baker in Hook. f. *Fl. Brit. Ind.* 6: 242. 1892; Holtt. in *Gard. Bull. Sing.* 13: 212. 1950; Backer & Bakh. f. *Fl. Java* 3 :54. 1968. *A. flavum* Rdl. in *J. Str. Br. Roy. As. Soc.*

32: 133. 1909 et *Fl. Mal. Pen.* 4: 263. 1924. (Plate I).

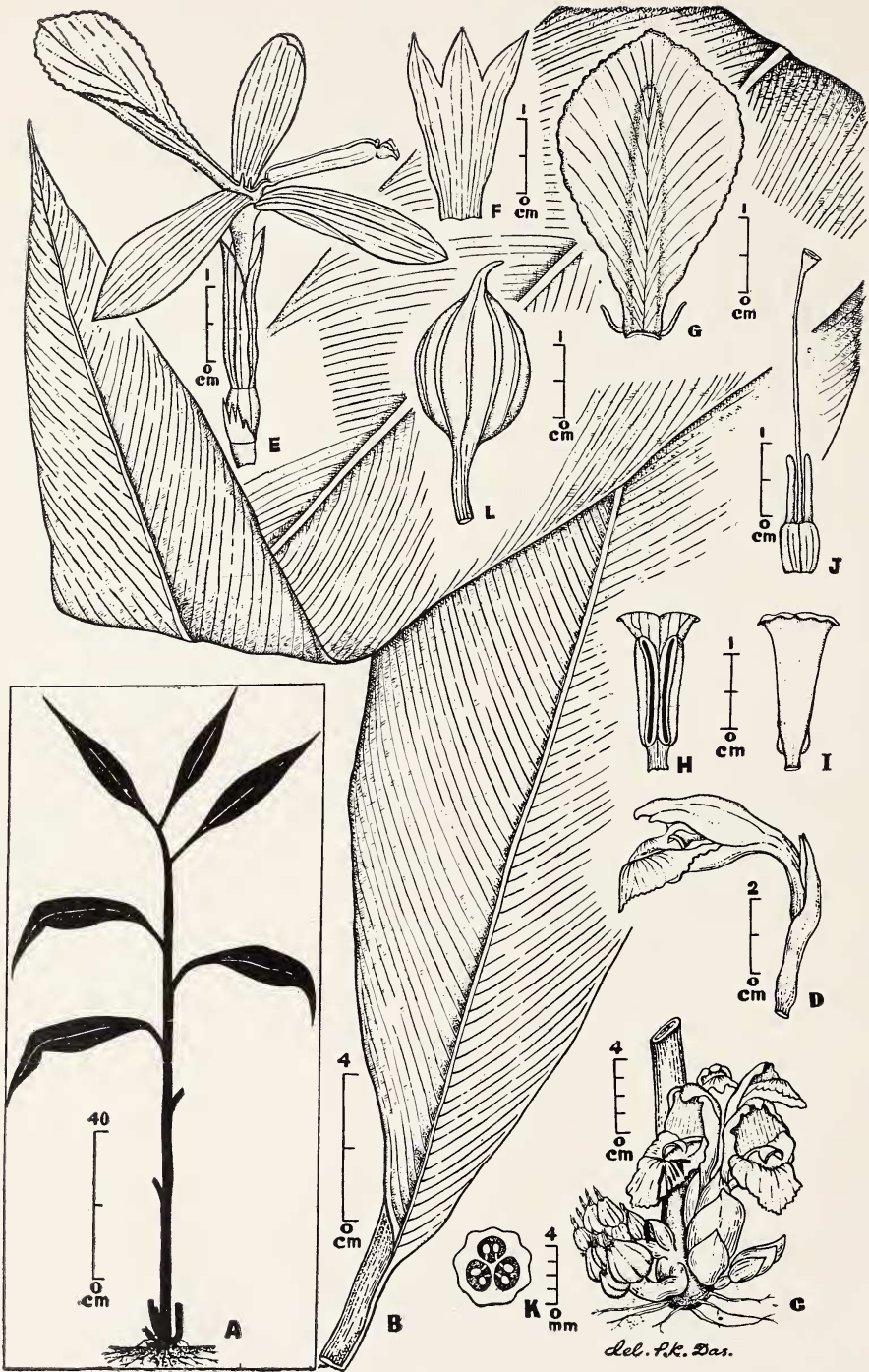
Plants 2.5-3.5 m high; rhizome branched, yellowish-brown; stems 2.5-3.5 cm thick, reddish at base; leaves appearing with flowers, distichous, elliptic, lanceolate, cuneate at base, acuminate at apex, 40-60 cm long, 7-12 cm broad, glabrous; petiole short; ligule  $\pm$  1 cm long, subentire to bifid. *Inflorescences* many, arising from rhizome; peduncles 12-22 cm long, 1.0-1.5 cm thick; sterile bracts many, spirally arranged, closely sheathing, ovate, cuspidate, 4.0-5.5 cm long, 2.5-3.5 cm broad, red; spikes oblong, 7-15 cm long, 4-7 cm thick; floral bracts ovate, boat-shaped, slightly notched at apex, 4.5-5.5 cm long, 2.0-2.5 cm wide, reddish purple; bracteole tubular, 1.2-1.4 cm long, pinkish purple; oblique and minutely incised at mouth, puberulous on keel; pedicels 2-3 mm long, 4-5 mm thick. *Calyx* tubular, 2.5-3.0 cm long, 3-keeled towards apex, split for up to half way, red, puberulous on keels towards apex; limb 2-lobed,  $\pm$  5 mm long; lobes ovate. *Corolla-tube* 1.6-1.8 cm long, white; lobes 3; lateral lobes elliptic-oblong, obtuse to subacute, 2.5-2.8 cm long, 1.0-1.2 cm broad; median lobe obovate, obtuse, boat-shaped, 2.5-3.0 cm long, 2.5-3.0 cm broad. *Labellum* wedgeshaped, undulate-crispate at margin, 3.5-4.0 cm long, 3.8-4.2 cm broad, white with thick yellow red-striated median band, trilobed at apex; lateral lobes rounded,  $\pm$  1.5  $\times$  2 cm, hyaline; median lobe triangular, obtuse, subacute, sometimes bilobed, 6-8 mm long, 8-10 mm wide, hyaline, white with two thick yellow spots at middle. *Staminodes* 2, fixed at the base of lip, linear-subulate, 4-5 mm long. *Anther* oblong, 1.0-1.3 cm long, 5-6 mm broad, puberulous; crest 5-6 mm long, 1.5-1.7 cm broad, 3-lobed, white; lateral lobes orbicular, 5-7 mm long, 4-5 mm broad; median lobes truncate, rounded or irregularly cre-





*Amomum aculeatum* Roxb.

Fig. A. habit; B. rootstock with rhizomes and inflorescence; C. leaves; D. flower with bract; E. bracteole; F. calyx; G. corolla; H. lip; I. stamen, inner view; J. stamen, outer view; K. ovary with style and stylodes; L. t.s. of ovary.



*Amomum maximum* Roxb.

Fig. A. habit; B. leaf; C. rootstock with inflorescence and infructescence; D. flower with bract; E. flower spread out, bract removed; F. calyx; G. lip; H. stamen, inner view; I. stamen, outer view; J. ovary with style and stylodes; K. t.s. of ovary; L. fruit.

nate at apex, 3-5 mm long, 3-4 mm broad; filament linear, flat, 1.2-1.4 cm long, 3-4 mm broad, glabrous. *Ovary* 4-5 mm long, 3-4 mm thick, puberulous, pink; ovules numerous; style filiform, 4.2-4.5 cm long, puberulous; stigma cup-shaped, dorsoventrally compressed,  $\pm 1$  mm long,  $\pm 2$  mm broad, puberulous. *Stylodes* fleshy, cream-coloured, 2-3 mm long, many-lobed.

SOUTH ANDAMAN ISLAND: Ferrargunj-Miletilak,  $\pm 50$  m, 15 May 1976, N. G. Nair 3752.

*Distribution*: S. Andamans, Malaysia and Java.

The present specimens differ from true *A. aculeatum* in the smaller midlobe of labellum and in the white colour of the lip. However these differences seems to be of minor importance as they agree with *A. aculeatum* Roxb. in most major features.

3. *A. maximum* Roxb. Fl. Ind. 1: 41. 1820; Backer & Bakh. f. Fl. Java 3: 54. 1968. (Plate II).

Plants 2-3 m high; rhizome branched, yellowish-green; stems 3-5 cm thick at base; leaves appearing with flowers, distichous, broadly oblong-elliptic, cuneate at base, acuminate at apex, 50-70 cm long, 12-18 cm broad, dark green above, pale pubescent beneath; petioles 5-8 cm long, ligules  $\pm 3$  cm long, entire to 2 fid, *Inflorescences* several, crowded basally at ground level, arising from rhizome, appearing with and near base of leafy stem, ovoid; peduncles 10-15 cm long, 1.0-1.5 cm thick; sterile bracts several, spirally arranged, closely sheathing, ovate, mucronate, 5-8 cm long, 2.5-5.0 cm broad, white, tinged red; floral bracts becoming slimy and disappearing before anthesis, white; bracteole absent; pedi-

cels 4-5 mm long, 2-3 mm thick. *Calyx* enclosing ovary, 2-3 cm long, thinly hyaline with 3 triangular lobes. *Corolla-tube* 2.3-2.5 cm long, white; lobes 3, oblanceolate to obovate, subacute, 2.3-2.8 cm long, 0.8-1.2 cm broad, white. *Labellum* elliptic-obovate, 3.0-3.5 cm long, 1.6-1.9 cm broad, longer than corolla lobes, entire, undulate crispate at margin, white, with thick yellow red-speckled median band; claw  $\pm 2$  mm long, reddish above. *Staminodes* 2, subulate,  $\pm 2$  mm long, inserted at base of lip. *Anther* 1.3-1.5 cm long, glabrous with connective prolonged into a crest; crest truncate, broad at apex, split or emarginate at middle, recurved at margin, 2-3 mm long, 8-10 mm broad, white, nerved; filament flat, 2-3 mm long,  $\pm 2$  mm broad, white, scattered glandular-hairy. *Ovary* drum-shaped, angular, 5-6 mm long, 4-5 mm thick, 3-celled, glabrous; ovules numerous; style filiform, white, lying between anther cells, 3.3-3.5 cm long; stigma widened at apex, cup-shaped, compressed dorsoventrally,  $\pm 1.5$  mm across, ciliolate at margins. *Stylodes* 2, free, on both sides of stylar bases, semicylindrical, obtuse, 7-8 mm long, yellowish. *Fruits* in dense heads, ovoid, 2.5-3.0 cm long, 2.0-2.5 cm thick, aromatic, longitudinally 9-winged; wings imperfectly irregularly toothed.

SOUTH ANDAMAN ISLAND: Ferrargunj-Miletilak,  $\pm 50$  m, 15 May 1976, N. G. Nair 3751.

*Distribution*: S. Andamans and Java (?).

#### ACKNOWLEDGEMENTS

We are grateful to Mr. B. L. Burtt and Miss R. M. Smith of Edinburgh Herbarium for studying the descriptions and illustrations of *A. aculeatum* Roxb. and *A. maximum* Roxb. and for their opinion.

N. P. BALAKRISHNAN  
N. G. NAIR

BOTANICAL SURVEY OF INDIA,  
ANDAMAN AND NICOBAR CIRCLE,  
PORT BLAIR, ANDAMAN,  
August 31, 1977.